REMARKS

A. Status of Claims and Amendments

Favorable reconsideration of this application as presently amended is respectfully requested. Claims 1, 3 through 7, 9 through 20, 22 through 26, 28 through 34, and 36 through 39 are pending. Claims 2, 8, 21, 27 and 35 have been previously canceled. Claims 9 through 11, 13 and 28 through 30 and 32 have been withdrawn as being drawn to non-elected species.

Claim 1 has been amended to recite that said hydrophilic treatment is performed using a reaction gas containing oxygen gas in at least one of said physical treatment step and said chemical treatment step so that OH groups are attached to the surfaces of both said objects to be bonded. Claim 20 has been similarly amended to recite that said hydrophilic treatment being performed using a reaction gas containing oxygen gas in at least one of said physical treatment step and said chemical treatment step so that OH groups are attached to the surfaces of the objects. Support for this amendment may be found, for example, in the first full paragraphs at pages 6, 7, and 26, as well as FIG. 5, of the present application.

In view of the amendments to Claims 1 and 20, Claims 3 and 22 have been amended to recite a reaction gas which is oxygen gas or nitrogen gas, while Claims 14 and 33 have been amended to recite a mixed gas containing oxygen gas and nitrogen gas, and Claims 15 and 34, have been amended to recite a plasma reaction gas in said chemical treatment step which is switched from a reaction gas containing oxygen gas in said physical treatment step to a reaction gas containing nitrogen gas. Support for these amendments may be found, for example, in the first full paragraph at page 26 of the present application.

B. Procedural Matters

Applicant notes the Examiner's acknowledgment of the acceptance of the response filed on October 1, 2007 where Applicant elected group I, drawn to pending Claims 1, 3 through 7, and 14 through 18.

Applicant further notes the Examiner's acknowledgment of the acceptance of the response filed on October 24, 2007 where: (1) Applicant elected species D drawn to pending Claims 1, 3 through 7, 14 through 20, 22 through 26, 31, 33 through 34 and 36 through 39; and the Examiner has withdrawn from consideration Claims 9 through 11, 13, 28 through 30 and 32.

C. Response to Rejections under 35 U.S.C. 103(a)

1. Response to Rejection of Claims 1, 3 through 7, 14 and 16 through 18 as Unpatentable over Nagakubo et al.

At pages 3 through 5 of the Office Action, Claims 1, 3 through 7, 14 and 16 through 18 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,904,860 (Nagakubo et al.). This rejection is respectfully traversed with respect to these Claims, as amended or as currently presented.

This rejection of Claims 1, 3 through 7, 14 and 16 through 18 is improper because the Office Action has failed to properly allege a *prima facie* case of obviousness. As set forth in MPEP § 706.02(j): "To establish a *prima facie* case of obviousness, [the following] criteria must be met. First, ***there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings*** . . . . Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The ***teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Appellant's disclosure***.[1]

Contrary to what is alleged by the Office Action, Nagakubo et al. does not teach the following features of Claim 1:

a. a surface activation step performing a hydrophilic treatment on the surfaces of both of objects to be bonded. The Office Action relies on column 4, lines 8-14, Nagakubo et al. to teach this surface action step. But nowhere does this cited

[1] *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See also MPEP § 2143- §2143.03 for decisions pertinent to each of these criteria (emphasis added)."

portion of Nagakubo et al. teach "performing a hydrophilic treatment" on "the surfaces of both of objects to be bonded" according to Claim 1. In fact, and contrary to 37 CFR 1.104(c)(2), it is completely unclear from the Office Action where Nagakubo et al. teaches "performing hydrophilic treatment" in the "surface activation step" on "the surfaces of both of objects to be bonded" according to Claim 1.

b. the hydrophilic treatment is performed using oxygen gas as a reactive gas. At the bottom of page 3, the Office Action says that Nagakubo et al. "discloses that the reactive gases can be hydrogen and ammonia," apparently conceding that Nagakubo et al. does not teach "using a reaction gas containing oxygen gas" according to amended Claim 1. Instead, the Office Action alleges that one skilled in the art "would know to use oxygen as one of the reactive gases in the case where the second member lacks oxygen on the surface" (referring to column 1, lines 12-25 of Nagakubo et al.). But the referenced portion of Nagakubo et al. does not teach or suggest what the Office Action alleges. What the Office Action alleges regarding what one skilled in the art about the "use of oxygen as one of the reactive gases in the case where the second member lacks oxygen on the surface" is simply an improper conclusory statement, as well as unsupported speculation, because the portion of Nagakubo et al. referred to in the Office Action does not support this allegation, nor does the Office Action refer to any other verifiable evidence that would support this allegation. "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion obviousness (emphasis added).[2] In fact, and contrary to 37 CFR 1.104(c)(2), it is completely unclear from the Office Action where

[2] *See e.g., In re Kahn*, 78 U.S.P.Q.2d at 1336. See also admonition by the Deputy Commissioner for Patent Operations for the USPTO in a May 3, 2007 memorandum in response to Supreme Court's recent decision in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. ____ (2007) that "in formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed."

Nagakubo et al. teaches "using a reaction gas containing oxygen gas" according to Claim 1.

c. bonding objects together in a solid phase at 500°C or less. The Office Action alleges that one skilled in the art, reading Nagakubo et al., "would bond at the lowest effective temperature, i.e. less than 500°C because Nagakubo et al. bonds at a low temperature" (referring to column 3, lines 30-31). But the Office Action never properly explains why "low temperature" from the referenced portion of Nagakubo et al. would necessarily refer to a temperature of less than 500°C, especially since nowhere does Nagakubo et al. exemplify what temperatures are used in its method. Instead, this allegation by the Office Action that "low temperature" means "less than 500°C" is simply an improper conclusory statement, as well as unsupported speculation, because the portion of Nagakubo et al. referred to in the Office Action never says what is meant by "low temperature" or otherwise exemplifies what temperatures are used. "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion obviousness (emphasis added)."[3] In fact, and contrary to 37 CFR 1.104(c)(2), it is completely unclear from the Office Action how Nagakubo et al. teaching of "low temperatures" necessarily teaches a temperature of "500°C or less" according to Claim 1.

d. OH groups are attached to the surfaces of both objects to be bonded. By contrast, in treating the bodies 13 and 14 with hydrogen (see, for example, FIGS. 4A through 4D of Nagakubo et al.), Nagakubo et al. forms NH groups from dangling bonds of nitrogen atoms on body 13 and OH groups from dangling bonds of oxygen atoms on body 14. Nowhere does Nagakubo et al. teach forming OH

[3] *See e.g., In re Kahn*, 78 U.S.P.Q.2d at 1336. See also admonition by the Deputy Commissioner for Patent Operations for the USPTO in a May 3, 2007 memorandum in response to Supreme Court's recent decision in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. ____ (2007) that "in formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed."

groups on the surfaces of both bodies to be bonded together according to amended Claim 1 (see column 4, lines 48-59 of Nagakubo et al.). See also FIG. 5 of Nagakubo et al. which shows NH groups being formed from dangling nitrogen atoms on both body 13 and body 14, as well as column 2, lines 29-31 of Nagakubo et al. which teaches that the surface of the second body (*i.e.*, body 14) need not be terminated with hydrogen atoms.

e. It should be appreciated that one of the features of the present invention is to perform a treatment using plasma only. That is, the present invention relates to a bonding technique which has been realized by using plasma only and devising how to emit the plasma. In contrast, Nagakubo et al. relates to a process using i) an ion beam and ii) a plasma in combination. It is obvious for those skilled in the art that the process of using an ion beam is a high vacuum process (col. 4, line 40). Applicant's process does not need this high vacuum process since it is only an plasma process. Thus, Nagakubo et al. teaches away from the present invention.

In other words, the rejection of amended Claim 1 over Nagakubo et al. fails to satisfy at least one of the criteria set forth in MPEP § 706.02(j) for a *prima facie* case obviousness, namely that the prior art reference must teach or suggest all the claim limitations. In fact, as noted above, Nagakubo et al. fails to teach at least four features of the method of amended Claim 1.

Claims 3 through 7, 14, and 16 through 18 (which ultimately depend from amended Claim 1) are unobvious over Nagakubo et al. for the same reasons amended Claim 1 are unobvious over Nagakubo et al. Nagakubo et al. also does not teach or suggest other features of Claims 3 and 14 through 16, again making this rejection *prima facie* improper under in MPEP § 706.02(j).

Regarding Claim 3, nowhere does Nagakubo et al. teach or suggest using oxygen gas or nitrogen gas as a reactive gas. Instead, Nagakubo et al. only teaches hydrogen or ammonia as reactive gases (see column 4, line 3-4 of Nagakubo et al.).

Regarding Claim 14, nowhere does Nagakubo et al. teach or suggest using a reaction gas in the chemical treatment step which is a mixed gas containing oxygen gas and nitrogen gas.

Instead, Nagakubo et al. only teaches hydrogen or ammonia as reactive gases (see column 4, line 3-4 of Nagakubo et al.).

Regarding Claim 16, and contrary to what the Office Action alleges, the referenced portions of Nagakubo et al. (column 6, lines 23-30) do not teach or suggest that during bonding, a voltage is applied between both objects to be bonded so that objects to be bonded are bonded together in a solid phase while being heated. Instead, the referenced portions of Nagakubo et al. teach that "microwaves are introduced into the vacuum chamber 11 through the plasma generating source 3 without generating plasma therein. As a result, water molecules absorbed on the surfaces of the first body 13 and the second body 14 are vigorously vibrated by the vibrating electric field caused by the microwaves so that the water molecules are removed (emphasis added)."

Alternatively, and as noted and suggested above, the Examiner's allegations at pages 2 through 5 of the Office Action regarding what Nagakubo et al. teaches or suggests with respect to Claims 1, 3 through 7, 14 and 16 through 18, as amended or as currently presented, and/or where these allegations are supported by Nagakubo et al., are so unclear that they fail to adequately inform Applicant what this rejection of these Claims under 35 U.S.C. § 103(a) over Nagakubo et al. is based on, in violation 37 CFR 1.104(c)(2). In fact, these allegations are so unclear that they appear to be based on the personal knowledge of the Examiner. Accordingly, if the Examiner wishes to persist in these unclear allegations regarding what Nagakubo et al. teaches or suggests with respect to Claims 1, 3 through 7, 14 and 16 through 18, as amended or as currently presented, Applicant respectfully requests that she provide an affidavit/declaration under 37 CFR 1.104(d)(2) because these allegations appear to be based on the Examiner's personal knowledge, and not what is fairly taught or suggested by Nagakubo et al.[4]

For at least the foregoing reasons, Claims 1, 3 through 7, 14 and 16 through 18, as amended or as currently presented, are unobvious over Nagakubo et al.

[4] Applicant notes that in the unpublished case of *In re Sun*, 31 USPQ2d 1451, 1455 (Fed. Cir. 1993), the USPTO argued "the procedures established by 37 C.F.R. Section 1.107(b) (1993) [now 37 CFR § 1.104(d)(2)] ***expressly entitle*** an Applicant, on mere request, to an examiner affidavit that provides [citations that support the Examiner's asserted level of skill in the art]" (emphasis added). Furthermore, in *In re Sun*, the Federal Circuit, held that "this procedure, so readily available, helps save the lack of citation in an office action from possible constitutional infirmity in denying reasonable notice and hence due process." See 31 USPQ2d at 1455.

2. Response to Rejection of Claim 12 as Unpatentable over Nagakubo et al., in view of Li et al.

At pages 5 through 6 of the Office Action, Claim 12 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Nagakubo et al. as applied to Claim 1, and further in view of U.S. Patent No. 6,299,787 (Li et al.). This rejection is respectfully traversed with respect to Claim, as currently presented, for the same reasons that amended Claim 1 (from which Claim 12 depends) is unobvious over Nagakubo et al. alone, namely that the Office Action has failed to properly allege a *prima facie* case of obviousness because not all features of amended Claim 1 are taught by Nagakubo et al.

This rejection of Claim 12, as currently presented, is also respectfully traversed as *prima facie* improper for the following additional reasons. The Office Action concedes that it is "unclear" whether Nagakubo et al. teaches "replacing the ECR with a plasma electrode including an object-to-be-bonded holding electrode and a counter surface electrode which are provided at two positions and can be used for said plasma electrode." Instead, the Office Action relies on Li et al. to allegedly teach that a polymer material may be treated in a continuous production line by passing the polymer to be treated through a series of physically separated plasma electrodes (referring to column 3, lines 35-48). The Office Action then alleges that it would have been obvious to use a series of rooms with plasma emitting means as allegedly taught by Li et al. instead of reducing the ion strike force on one plasma emitting means as allegedly taught by Nagakubo et al. "in order to increase the efficiency of the process by making it continuous."

But this rejection of Claim 12 over Nagakubo et al. in view of Li et al. is further *prima facie* improper under MPEP § 706.02(j) because the Office Action has failed to properly allege where or how these references teach or suggest all the claim limitations of Claim 12, including other features of Claim 12. Contrary to what is alleged in the Office Action, Nagakubo et al. and Li et al., alone or combined, do not teach at least the following other features of Claim 12:

a. a first and a second low-pressure plasma emitting means each of which emits a low-pressure plasma having a different ion strike force. By contrast, and contrary to what is alleged in the Office Action, the referenced portions of Nagakubo et al. (column 5, lines 34-40), as well as Li et al. (column 3, lines 35-40), do not teach

or suggest two low-pressure plasma emitting means "which emit a different low-pressure plasma having a different ion strike force." Instead, column 5, lines 34-40 of Nagakubo et al. simply teach using hydrogen gas plasma with an ECR device, and that "other techniques may be used to generate hydrogen plasma." In fact, and contrary to 37 CFR 1.104(c)(2), it is completely unclear from the Office Action how this referenced portion of Nagakubo et al. teaches or even suggests two low-pressure plasma emitting means "which emit a different low-pressure plasma having a different ion strike force" according to Claim 12. Column 3, lines 35-48 of Li et al. only teaches that the plasma may be alternately ignited or extinguished, that the polymer may repeatedly moved into and out of a single plasma discharge zone, or that intermittent plasma treatment may be achieved by passing the polymer through a series of physically separated discharge zones. Again, and contrary to 37 CFR 1.104(c)(2), it is completely unclear from the Office Action how this referenced portion of Li et al. teaches or even suggests two low-pressure plasma emitting means "which emit a different low-pressure plasma having a different ion strike force" according to Claim 12.

b. a power supply applied to an object-to-be-bonded holding electrode of the first low-pressure plasma emitting means in said first half of the plasma treatment to generate a low-pressure plasma, thereby performing a plasma treatment for performing said physical treatment. Contrary to 37 CFR 1.104(c)(2), nowhere does the Office Action alleged where this feature of Claim 12 is taught or suggested in Nagakubo et al. or Li et al.

c. in the second half of the plasma treatment, switching the first low-pressure plasma emitting means to the second low-pressure plasma emitting means which traps plasma ions generated in another room and emits radicals, thereby reducing the ion strike force so that a plasma treatment for promoting the chemical treatment is performed. Contrary to 37 CFR 1.104(c)(2), nowhere does the Office Action alleged where this feature of Claim 12 is taught or suggested in Nagakubo et al. or Li et al. In particular, the referenced portion of Li et al. (column 3, lines 35-48)

does not teach this feature of Claim 12, especially "switching the first low-pressure plasma emitting means to the second low-pressure plasma emitting means." All that this referenced portion of Li et al. teaches, at most, is using a series of physically separated zones, none of which is characterized by Li et al. as a "low-pressure plasma emitting means."

Alternatively, and as noted and suggested above, the Examiner's allegations at pages 5 through 6 of the Office Action as to what Nagakubo et al. and/or Li et al. teach or suggest with respect to Claim 12, how the teachings of Nagakubo et al. and/or Li et al. are being applied against Claim 12, as well as how the teachings of Nagakubo et al. and Li et al. are being combined with respect to Claim 12, are so unclear that they fail adequately inform Applicant what this rejection of Claim 12 under 35 U.S.C. § 103(a) over Nagakubo et al. in view of Li et al. is based on, in violation 37 CFR 1.104(c)(2). In fact, these allegations are so unclear that they appear to be based on the personal knowledge of the Examiner. Accordingly, if the Examiner wishes to persist in these unclear allegations regarding what Nagakubo et al. and/or Li et al. teach or suggest with respect to Claim 12, how the teachings of Nagakubo et al. and/or Li et al. are being applied against Claim 12, as well as how the teachings of Nagakubo et al. and Li et al. are being combined with respect to Claim 12, Applicant respectfully requests that she provide an affidavit/declaration under 37 CFR 1.104(d)(2) because these allegations appear to be based on the Examiner's personal knowledge, and not what is fairly taught or suggested by Nagakubo et al. and/or Li et al.[5]

For at least the foregoing reasons, Claim 12, as currently presented, is unobvious over Nagakubo et al., even in view of Li et al.

[5] Applicant again notes that in the unpublished case of *In re Sun*, 31 USPQ2d 1451, 1455 (Fed. Cir. 1993), the USPTO argued "the procedures established by 37 C.F.R. Section 1.107(b) (1993) [now 37 CFR § 1.104(d)(2)] ***expressly entitle*** an Applicant, on mere request, to an examiner affidavit that provides [citations that support the Examiner's asserted level of skill in the art]" (emphasis added). Furthermore, in *In re Sun*, the Federal Circuit, held that "this procedure, so readily available, helps save the lack of citation in an office action from possible constitutional infirmity in denying reasonable notice and hence due process." See 31 USPQ2d at 1455.

3. Response to Rejection of Claims 1, 3 through 7, 14 and 16 through 18 as Unpatentable over Nagakubo et al., in view of Admitted Prior Art

At page 6 of the Office Action, Claims 1 through 7, 14 and 16 through 18 have also been rejected under 35 U.S.C. 103(a) as being unpatentable over Nagakubo et al. as applied to Claim 1 and further in view of the alleged admitted prior art (APA).

This rejection of Claims 1, 3 through 7, 14 and 16 through 18, as amended or as currently presented, over Nagakubo et al., even in view of the alleged APA, is respectfully traversed for the same reasons that these Claims are unobvious over Nagakubo et al., namely that the Office Action has failed to properly allege a *prima facie* case of obviousness because not all features of these Claims are taught by Nagakubo et al..

This rejection of Claims 1, 3 through 7, 14 and 16 through 18, as amended or as currently presented, over Nagakubo et al., even in view of the alleged APA, is also respectfully traversed as *prima facie* improper for the following additional reasons. The Office Action relies on the alleged APA at page 1 of the present application to teach "that it is known in the art to use oxygen as a reactive gas to alter the surface of an object to be bonded using oxygen plasma to form a hydrogen bond." The Office Action then alleges that it would have been obvious to use oxygen as one of the reactive gases in the method of Nagakubo et al. "because it is known in the art to use oxygen plasma in order to modify an object to be bonded including forming a hydrogen bond."

But this rejection of Claims 1 through 7, 14 and 16 through 18 over Nagakubo et al. in view of the alleged APA, is further *prima facie* improper under MPEP § 706.02(j) because the Office Action has failed to allege any proper motivation for combining the alleged APA with Nagakubo et al. To properly combine the alleged APA with Nagakubo et al., the Office Action must allege some proper motivation for one skilled in the art to do so.[6] The suggestion, teaching or motivation may be implicit or explicit.[7] But "[r]ejections on obviousness grounds cannot be

[6] *See In re Fine* and *In re Kahn* cases cited above with regard to the rejection of Claims 32-35.
[7] *See e.g., In re Kahn*, 78 U.S.P.Q.2d 1329, 1336 (Fed. Cir. 2006) ("A suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art, as the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated by the references....

sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion obviousness (emphasis added)."[8]

The Office Action provides no properly alleged motivation for combining the alleged teaching of the APA (using oxygen as a reactive gas to alter the surface of an object to be bonded using oxygen plasma to form a hydrogen bond) with those of Nagakubo et al. (method for bonding member with a nitride surface to another member with a nitride or oxygen surface terminated with hydrogen atoms by reacting the surfaces with hydrogen or ammonia). As stated in the alleged APA at page 1, oxygen plasma is used to subject surfaces of wafers to a hydrophilic treatment. Nowhere does the Office Action properly allege why one skilled in the art would consider the hydrophilic treatment taught by the alleged APA to be desirable or even relevant in the method of Nagakubo et al. Nor does the Office Action properly explain how what is taught by the alleged APA provides all of the features noted above for amended Claim 1 which are not taught by Nagakubo et al.

Alternatively, and as noted and suggested above, the Examiner's allegations at page 6 through 6 of the Office Action as to what Nagakubo et al. and the alleged APA teach or suggest with respect to Claims 1, 3 through 7, 14 and 16 through 18, how the teachings of Nagakubo et al. and the alleged APA are being applied against Claims 1, 3 through 7, 14 and 16 through 18, as well as how and on what basis the teachings of Nagakubo et al. and the alleged APA are being combined with respect to Claims 1, 3 through 7, 14 and 16 through 18, are so unclear that they fail adequately inform Applicant what this rejection of Claims 1, 3 through 7, 14 and 16 through 18 under 35 U.S.C. § 103(a) over Nagakubo et al. in view of the alleged APA is based on, in violation 37 CFR 1.104(c)(2). In fact, these allegations are so unclear that they appear to be based on the personal knowledge of the Examiner. Accordingly, if the Examiner wishes to persist in these unclear allegations regarding how the teachings of Nagakubo et al. and the alleged APA are being applied against Claims 1, 3 through 7, 14 and 16 through 18, as well as how and on what basis the teachings of Nagakubo et al. and the alleged APA are being combined with respect to Claims 1, 3 through 7, 14 and 16 through 18, Applicant respectfully requests that

[8] *See e.g., In re Kahn*, 78 U.S.P.Q.2d at 1336. See also admonition by the Deputy Commissioner for Patent Operations for the USPTO in a May 3, 2007 memorandum in response to Supreme Court's recent decision in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. ____ (2007) that "in formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed."

she provide an affidavit/declaration under 37 CFR 1.104(d)(2) because these allegations appear to be based on the Examiner's personal knowledge, and not what is fairly taught or suggested by Nagakubo et al. and/or the alleged APA.[9]

For at least the foregoing reasons, Claims 1, 3 through 7, 14 and 16 through 18, as amended or as currently presented, are unobvious over Nagakubo et al., even in view of the alleged APA.

4. Response to Rejection of Claim 12 as Unpatentable over Nagakubo et al. and the Alleged APA, in view of Li et al.

At pages 6 through 7 of the Office Action, Claim 12 has also been rejected under 35 U.S.C. 103(a) as being unpatentable over Nagakubo et al. and the alleged admitted prior art (APA) as applied to Claim 1, and further in view of Li et al.

This rejection of Claim 12, as currently presented, over Nagakubo et al. and the alleged APA, even in view of Li et al., is respectfully traversed for the same reasons that: (a) amended Claim 1 (from which Claim 12 depends) is unobvious over Nagakubo et al., namely that the Office Action has failed to properly allege a *prima facie* case of obviousness because not all features of amended Claim 1 are taught by Nagakubo et al.; (b) Claim 12 is unobvious over Nagakubo et al. in view of Li et al., namely that the Office Action has failed to properly allege a *prima facie* case of obviousness because not all of the other features of Claim 12 are taught by Nagakubo et al. and/or Li et al.; and (c) amended Claim 1 is unobvious over Nagakubo et al., even in view of the alleged APA, namely that the Office Action has failed to allege any proper motivation for combining the teachings of the alleged APA with those of Nagakubo et al.

This rejection of Claim 12 is also *prima facie* improper for the following additional reasons. All that the Office Action alleges in rejecting Claim 12 over Nagakubo et al. and the alleged APA in view of Li et al. is that: (a) Nagakubo et al. and the alleged APA are applied as to Claim 1; and (b) Claim 12 "is rejected as before." But contrary to 37 CFR 1.104(c)(2) and

[9] Applicant again notes that in the unpublished case of *In re Sun*, 31 USPQ2d 1451, 1455 (Fed. Cir. 1993), the USPTO argued "the procedures established by 37 C.F.R. Section 1.107(b) (1993) [now 37 CFR § 1.104(d)(2)] ***expressly entitle*** an Applicant, on mere request, to an examiner affidavit that provides [citations that support the Examiner's asserted level of skill in the art]" (emphasis added). Furthermore, in ***In re Sun***, the Federal Circuit, held that "this procedure, so readily available, helps save the lack of citation in an office action from possible constitutional infirmity in denying reasonable notice and hence due process." See 31 USPQ2d at 1455.

MPEP § 706.02(j), this rejection of Claim 12 is *prima facie* improper because the Office Action fails to adequately identify: (1) what portions of Nagakubo et al., the alleged APA and/or Li et al. are being relied upon with respect to Claim 12; (2) what and how those portions Nagakubo et al., the alleged APA and/or Li et al. relied upon are being combined together relative to Claim 12; and (3) what the alleged basis or motivation is for combining those portions of Nagakubo et al., the alleged APA and/or Li et al. relied upon against Claim 12. Indeed, it is completely unclear how this rejection of Claim 12 over the combined teachings of Nagakubo et al., the alleged APA and Li et al. differs from the rejection of Claim 12 over Nagakubo et al., in view of Li et al. only.

In fact, the basis for this rejection of Claim 12 over Nagakubo et al., the alleged APA and Li et al. is so unclear that this rejection appears to be based on the personal knowledge of the Examiner. Accordingly, if the Examiner wishes to persist in this rejection of Claim 12 over Nagakubo et al. and the alleged APA, in view of Li et al., Applicant respectfully requests that she provide an affidavit/declaration under 37 CFR 1.104(d)(2) because the basis for this rejection appears to be based on the Examiner's personal knowledge, and not what is fairly taught or suggested by Nagakubo et al., the alleged APA and/or Li et al.[10]

For at least the foregoing reasons, Claim 12, as currently presented, is unobvious over Nagakubo et al. and the alleged APA, even in view of Li et al.

5. Response to Rejection of Claim 15 as Unpatentable over Nagakubo et al. and the Alleged APA, in view of Wagner et al.

At pages 7 through 8 of the Office Action, Claim 15 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Nagakubo et al. and the alleged admitted prior art (APA) as applied to claim 1, and further in view of U.S. Patent No. 4,871,433 (Wagner et al.).

The Office Action alleges that Nagakubo et al. teaches that sputter etching may be used in place of inert gas cleaning step from the unspecified "illustrative example." The Office

[10] Applicant again notes that in the unpublished case of *In re Sun*, 31 USPQ2d 1451, 1455 (Fed. Cir. 1993), the USPTO argued "the procedures established by 37 C.F.R. Section 1.107(b) (1993) [now 37 CFR § 1.104(d)(2)] ***expressly entitle*** an Applicant, on mere request, to an examiner affidavit that provides [citations that support the Examiner's asserted level of skill in the art]" (emphasis added). Furthermore, in *In re Sun*, the Federal Circuit, held that "this procedure, so readily available, helps save the lack of citation in an office action from possible constitutional infirmity in denying reasonable notice and hence due process." See 31 USPQ2d at 1455.

Action also alleges that "one reading the reference as a whole would realize that Nagakubo et al. is not concerned with a particular inert gas or a particular reactive gas because there are no restrictions as to what may be used for the gas" (referring to column 3, lines 55-60, column 4, lines 1-5 and column 5, lines 24-26 of Nagakubo et al.). The Office Action further alleges that the "second half of the plasma etching procedure includes a reaction gas that contains nitrogen in one embodiment" referring to column 4, lines 4-5 of Nagakubo et al.).

The Office Action concedes that it is "unclear whether Nagakubo et al." teaches that the "plasma reaction gas is switched from a reaction gas containing oxygen" in the physical treatment step to "a reaction gas containing nitrogen during a plasma treatment using a reduced ion strike force in" the second half of the plasma treatment. Instead, the Office Action relies on Wagner et al. to allegedly teach that "it is known in the art to include oxygen with argon in the sputtering chamber in to cause film removal to proceed more effectively" (referring to column 1, lines 60-65 of Wagner et al.). The Office Action then alleges that it would have been obvious to "use oxygen and argon in the sputter etching step disclosed by Nagakubo et al. because Wagner et al. teaches that the oxygen radical will react with the substrate to form volatile compounds at the same time as the substrate is being struck by argon, for a more effective sputtering technique."

This rejection of Claim 15, as amended, over Nagakubo et al. and the alleged APA, even in view of Wagner et al., is respectfully traversed for the same reasons that: (a) amended Claim 1 (from which amended Claim 15 depends) is unobvious over Nagakubo et al., namely that the Office Action has failed to properly allege a *prima facie* case of obviousness because not all features of amended Claim 1 are taught by Nagakubo et al.; and (b) amended Claim 1 is unobvious over Nagakubo et al., even in view of the alleged APA, namely that the Office Action has failed to allege any proper motivation for combining the teachings of the alleged APA with those of Nagakubo et al.

This rejection of Claim 15, as amended, over Nagakubo et al. and the alleged APA, even in view of Wagner et al., is also *prima facie* improper for the following additional reasons. First, the Office Action fails to properly allege a *prima facie* case of obviousness under MPEP § 706.02(j) because there are other features of Claim 15 that are not taught or suggested by the combined references relied on in the Office Action. Nowhere does Nagakubo et al. teach or suggest that the reaction gas in the physical treatment step contains oxygen gas according to

amended Claim 15. Instead, Nagakubo et al. (see column 4, line 28-32) only teaches using the inert gas argon in a "physical treatment step." In addition, nowhere does Nagakubo et al. teach or suggest switching the reaction gas containing oxygen gas in the physical treatment step to a reaction gas containing nitrogen gas in the chemical treatment step, much less teach or suggest using a reaction gas containing nitrogen gas in the chemical treatment step, according to Claim 15. Instead, Nagakubo et al. only teaches using an inert gas such as argon in a "physical treatment step" (see column 4, line 28-32), while only using hydrogen or ammonia as reactive gases in the "chemical treatment step" (see column 4, line 3-4).

To the extent that the portions relied on in Wagner et al. allegedly teach including oxygen and argon in a sputter etching step, the Office Action still fails to properly allege where Nagakubo et al., the alleged APA, and/or Wagner et al., separately or combined, teach or suggest switching the reaction gas containing oxygen gas in the physical treatment step to a reaction gas containing nitrogen gas in the chemical treatment step, much less teach or suggest using a reaction gas containing nitrogen gas in the chemical treatment step, according to amended Claim 15. Instead, and as previously noted, Nagakubo et al. only teaches using hydrogen or ammonia as reactive gases in the "chemical treatment step" (see column 4, line 3-4 of Nagakubo et al.). In addition, neither the alleged APA, or Wagner et al. teach or suggest using a reaction gas containing nitrogen gas in the chemical treatment step, much less switching to a reaction gas containing nitrogen gas in the chemical treatment step from a reaction gas containing oxygen gas in the physical treatment step, according to Claim 15.

In addition, the allegation by the Office Action that "Nagakubo et al. is not concerned with a particular inert gas or a particular inert gas or a particular reactive gas because there are no restrictions as to what may be used for the gas" is simply an improper conclusory statement, as well as unsupported speculation, because the Office Action points to nothing in Nagakubo et al., or to any other verifiable evidence, to fairly support this allegation. "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion obviousness (emphasis added)."[11] The portions of Nagakubo et al. relied on in the Office Action

[11] *See e.g., In re Kahn*, 78 U.S.P.Q.2d at 1336. See also admonition by the Deputy Commissioner for Patent Operations for the USPTO in a May 3, 2007 memorandum in response to Supreme Court's recent decision in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. ____ (2007) that "in formulating a rejection under 35 U.S.C. § 103(a)

(column 3, lines 55-60, column 4, lines 1-5 and column 5, lines 24-26) simply do not fairly or reasonably support this allegation by the Office Action, and in particular switching from oxygen gas as the reactive gas in the physical treatment step to nitrogen gas as the reactive gas in the chemical treatment step according to amended Claim 15. In fact, this allegation by the Office Action again appears to be based on the personal knowledge of the Examiner. Accordingly, if the Examiner wishes to persist in this allegation regarding amended Claim 15, Applicant respectfully requests that she provide an affidavit/declaration under 37 CFR 1.104(d)(2) because this allegation appears to be based on the Examiner's personal knowledge, and not what is fairly taught or suggested by Nagakubo et al., the alleged APA and/or Wagner et al.

This rejection of Claim 15 over Nagakubo et al. and the alleged APA, in view of Wagner et al. is further *prima facie* improper because the Office Action has failed to allege any proper motivation for combining the teachings of Wagner et al. with those of the alleged APA and Nagakubo et al. To properly combine the teachings of Wagner et al. with those of the alleged APA and Nagakubo et al., the Office Action must allege some proper motivation for one skilled in the art to do so.[12] The suggestion, teaching or motivation may be implicit or explicit.[13] But "[r]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion obviousness (emphasis added)."[14]

The Office Action provides no properly alleged motivation for combining the alleged teaching of Wagner et al. (using a reactive gas such as oxygen or chlorine with argon in a reactive sputtering step) with those of the alleged APA (using oxygen as a reactive gas to alter the surface of an object to be bonded using oxygen plasma to form a hydrogen bond) and Nagakubo et al. (method for bonding member with a nitride surface to another member with a

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based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed."

[12] *See In re Fine* and *In re Kahn* cases cited above with regard to the rejection of Claims 32-35.

[13] *See e.g., In re Kahn,* 78 U.S.P.Q.2d 1329, 1336 (Fed. Cir. 2006) ("A suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art, as the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated by the references....

[14] *See e.g., In re Kahn,* 78 U.S.P.Q.2d at 1336. See also admonition by the Deputy Commissioner for Patent Operations for the USPTO in a May 3, 2007 memorandum in response to Supreme Court's recent decision in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. ____ (2007) that "in formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed."

nitride or oxygen surface terminated with hydrogen atoms by reacting the surfaces with hydrogen or ammonia). For example, the Office Action does not adequately or properly explain why one skilled would be motivated by or consider the teachings of Wagner et al. (using a reactive gas such as oxygen or chlorine with argon in a reactive sputtering step) relevant to Nagakubo et al. which only teaches use of an inert gas such as argon to clean the surfaces of the bodies to be bonded (see column 4, lines 28-32, of Nagakubo et al.) More significantly, the Office Action nowhere alleges why one skilled would be motivated by the teachings of Wagner et al. to switch from a reactive gas containing oxygen gas in the physical treatment step, to a reactive gas containing nitrogen gas in the chemical treatment step according.

In fact, the basis for combining the teachings of Wagner et al., with those of the alleged APA and Nagakubo et al. against amended Claim 15 appears to be based on the personal knowledge of the Examiner. Accordingly, if the Examiner wishes to persist in combining the teachings of Wagner et al., with those of the alleged APA and Nagakubo et al. with respect to amended Claim 15, Applicant respectfully requests that she provide an affidavit/declaration under 37 CFR 1.104(d)(2) because the basis for combining the teachings of Wagner et al., with those of the alleged APA and Nagakubo et al. appears to be based on the Examiner's personal knowledge, and not what is fairly taught or suggested by Nagakubo et al., the alleged APA and/or Wagner et al.

For at least the foregoing reasons, Claim 15, as amended, is unobvious over Nagakubo et al. and the alleged APA, even in view of Wagner et al.

D. Status of Pending Claims 19 through 20, 22 through 26, 31, 33 through 34, and 36 through 39

Contrary to the requirement of 37 CFR 1.104(b) that "the examiner's action will be complete as to all matters," nowhere does the Office Action indicate what the status is of pending Claims 19 through 20, 22 through 26, 31, 33 through 34, and 36 through 39. For example, the Office Action does not say that Claims 19 through 20, 22 through 26, 31, 33 through 34, and 36 through 39 have been withdrawn from consideration. Nor does the Office Action say that Claims 19 through 20, 22 through 26, 31, 33 through 34, and 36 through 39 have been rejected by the Examiner on any grounds. Instead, and until the Office Action says otherwise, Applicant

can only reasonably conclude that Claims 19 through 20, 22 through 26, 31, 33 through 34, and 36 through 39 are novel and unobvious over the art of record, and thus are in condition for allowance.

E. Conclusion

Claims 1, 3 through 7, and 14 through 18, as amended or as currently presented, are unobvious over the art relied on in the Office Action. In addition, Claims 19, 20, 22 through 26, 31, 33 through 34, and 36 through 39, as amended or as currently presented, are unobvious over the art relied on in the Office Action. Accordingly, Claims 1, 3 through 7, 14 through 20, 22 through 26, 31, 33 through 34, and 36 through 39, as amended or as currently presented, should now be in condition for allowance.

If the Examiner has any questions or concerns regarding the present response, the Examiner is invited to contact Ajay A. Jagtiani at 703-591-2664, Ext. 2001.

The Commission is hereby authorized by this paper to charge any fees during the entire pendency of this application including fees due under 37 C.F.R. §§ 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account **10-0233-YANE-0004-US1**.

Respectfully submitted,

/Ajay A. Jagtiani/Reg. No. 35,205
Ajay A. Jagtiani
Reg. No.: 35,205

Customer No. 22506

Date: February 26, 2008
Patent Administrator
Jagtiani + Guttag, LLLP
10363-A Democracy Lane
Fairfax, VA 22030
Telephone: (703) 591-2664
Facsimile: (703) 591-5907
CUSTOMER NO: 22506